Section 3.4 HW #1, 3, 9, 11, 15 January 4-5 2017

1. a $V(s) = s^3$

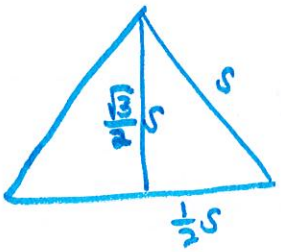
b. $\frac{dV}{ds} = 3s^2$

c. $\frac{dV}{ds}(1) = 3$ $\frac{dV}{ds}(5) = 75$

d. $\frac{dV}{ds} = \frac{in^3}{in}$

---

3. a.



$A(s) = \frac{1}{2}s \cdot \frac{\sqrt{3}}{2}s = \frac{\sqrt{3}}{4}s^2$

b. $\frac{dA}{ds} = \frac{\sqrt{3}}{2}s$

c. $\frac{dA}{ds}(2) = \sqrt{3}$ $\frac{dA}{ds}(10) = 5\sqrt{3}$

d. $\frac{dA}{ds} = \frac{in^2}{in}$

---

9. a. forward on $[0,1) \cup (5,7)$
backward on $(1,5)$
speed up on $(1,2) \cup (5,6)$
slow down on $(0,1) \cup (3,5) \cup (6,7)$

b. acceleration pos on $(3,6)$
" neg on $(0,2) \cup (6,7)$
" zero on $(2,3) \cup (7,9)$

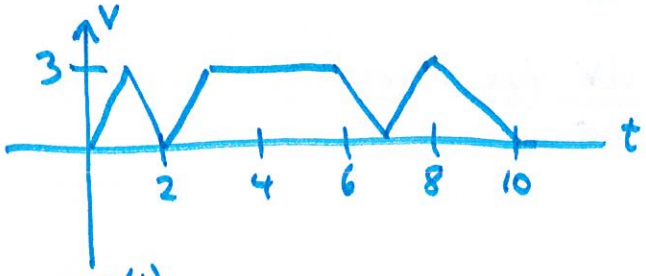
c. greatest speed at either $t=0$ or on $(2,3)$

d. stand still on $(7,9)$

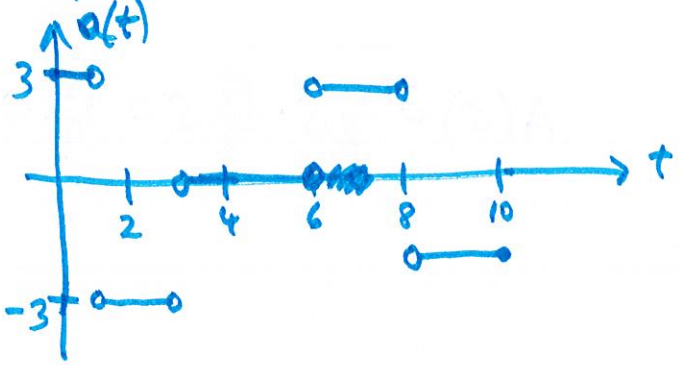
11. a. Reverse direction at $t=2$ and $t=7$

b. constant speed on $(3,6)$

c.



d.



---

15. $s = 24t - 4.9t^2$

$\frac{ds}{dt} = 24 - 9.8t$

$\frac{ds}{dt} = 0$ for horizontal tangent

$0 = 24 - 9.8t$

$9.8t = 24$

$t = \frac{24}{9.8} = \frac{240}{98} = \frac{120}{49} \approx 2.449$ sec

$s(2.449) = 24(2.449) - 4.9(2.449)^2 \approx 29.388$ meters